

4 INTERNATIONAL, FEDERAL, REGIONAL, AND STATE LEGISLATION, POLICIES, AND AGREEMENTS AFFECTING OIL AND GAS DEVELOPMENT IN THE GREAT LAKES

This section discusses the Federal and state policy and regulatory settings that currently control oil and gas development in the U.S. portion of the Great Lakes.

4.1 INTERNATIONAL POLICIES AND AGREEMENTS

Under the Boundary Waters Treaty of 1909,¹ Canada and the United States established the International Joint Commission (IJC) to prevent and resolve disputes over water use and provide independent advice on such other transboundary environmental issues as air and water pollution. Under the auspices of the IJC, in 1972 the two governments entered into the Great Lakes Water Quality Agreement (GLWQA) to “restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes basin ecosystem.” The focus of the IJC and the cooperating federal, state, and provincial agencies for nearly 30 years has been to develop and implement pollution-abatement measures that will restore and maintain beneficial uses of the lakes. In the IJC Eleventh Biennial Report (IJC 2002), the section entitled “further matter of importance” discussed the principles, as well as programs and measures, to prevent discharges of oil and other substances into the Great Lakes system from drill rigs, pipelines, wells, and other onshore or offshore facilities. The Twelfth Biennial Report (IJC 2004) however, did not mention the issue of drilling in the Great Lakes.

The International Association of Great Lakes and St. Lawrence Mayors has passed a resolution calling for a moratorium on Great Lakes oil and gas exploration, development, and extraction. The Chippewa Ottawa Resources Authority has also passed a resolution stating its unqualified opposition to any oil drilling activities to exploit oil deposits under the Great Lakes.²

The Great Lakes Commission was established by joint legislative action of the Great Lakes states in 1955 (the Great Lakes Basin Compact) and was granted Congressional consent in 1968. A Declaration of Partnership established associate membership for the provinces in 1999. The Great Lakes Commission is a binational public agency dedicated to the use, management, and protection of the water, land, and other natural resources of the Great Lakes-St. Lawrence system. In partnership with the eight Great Lakes states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin) and provinces of Ontario and Québec, the Commission applies sustainable development principles in addressing issues of resource management, environmental protection, transportation, and sustainable development.

¹ Treaty between the United States and Great Britain Relating to Boundary Waters and Questions Arising between the United States and Canada, Jan. 11, 1909 (36 Stat. 2448) (1909).

² See <http://www.glc.org/mayors>.

4.2 FEDERAL REGULATION OF OIL AND NATURAL GAS DRILLING

The Energy and Water Development Appropriations Act of 2002³ banned directional drilling underneath any of the Great Lakes for 2 years. This Act was approved on November 12, 2001. Section 503 of the bill states “That during the fiscal years (FY) 2002 and 2003, no Federal or State permit or lease shall be issued for new oil and gas slant, directional, or offshore drilling in or under one or more of the Great Lakes.” Section 503 also imposes on the Secretary of the Army the duty to conduct a study examining the “known and potential environmental effects of oil and gas drilling in the Great Lakes.” The moratorium on drilling was subsequently extended through FY 2005 in the Omnibus Appropriations Act of 2003,⁴ and again through FY 2007 by the Omnibus Appropriations Act of 2005.⁵ On August 8, 2005, the President signed into law the Energy Policy Act of 2005. Under Section 386 of this act, no Federal or State permit or lease shall be issued for new oil and gas slant, directional, or offshore drilling in or under one or more of the Great Lakes.

The Corps has responsibility for regulating activities for offshore drilling through its permit programs authorized under Section 10 of the Rivers and Harbors Act of 1899⁶ and Section 404 of the Clean Water Act (CWA).⁷ The geographic jurisdiction of the Rivers and Harbors Act of 1899 includes all navigable waters of the United States that are defined as “those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce.”⁸ The CWA uses the term “navigable waters,” which is defined as “waters of the U.S., including the territorial seas.”⁹ Thus, Section 404 jurisdiction is defined as encompassing Section 10 waters, plus their tributaries and adjacent wetlands and isolated waters where the use, degradation, or destruction of such waters could affect interstate or foreign commerce. Offshore drilling activities, including construction of drilling platforms in the lake and pipelines along the lakebed, clearly come within the Corps permitting jurisdiction.

³ Energy and Water Development Appropriations Act, Public Law (P.L.) No. 107-66, 115 Stat. 486 (2002).

⁴ P.L. 108-7, signed into law February 20, 2003.

⁵ P.L. 108-447, signed into law November 20, 2004.

⁶ *United States Code*, Title 33, Section 403 (33 USC § 403). “That the creation of any obstruction not affirmatively authorized by Congress, to the navigable capacity of any of the waters of the United States is hereby prohibited; and it shall not be lawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the United States, outside established harbor lines, or where no harbor lines have been established, except on plans recommended by the Chief of Engineers and authorized by the Secretary of War; and it shall not be lawful to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of, any port, roadstead, haven, harbor, canal, lake, harbor of refuge, or enclosure within the limits of any breakwater, or of the channel of any navigable water of the United States, unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of War prior to beginning the same.”

⁷ 33 USC § 1344.

⁸ Title 33, Part 329 of the *Code of Federal Regulations* (CFR Part 329).

⁹ 33 USC § 1362 [502(7)].

The Submerged Lands Act of 1953,¹⁰ granted title to and ownership of the lands beneath navigable waters (i.e., submerged lands or bottomlands) within the boundaries of the respective states, and the natural resources within such lands and waters to the states along with the right and power to manage, administer, lease, develop, and use the said lands and natural resources all in accordance with applicable state law. Under this Act, the Federal government released and relinquished all right, title, and interest in and to all said lands, improvements, and natural resources with certain exceptions, including powers of regulation and control of said lands and navigable waters for the constitutional purposes of commerce, navigation, national defense, and international affairs. In addition, the Federal government still has authority over the use, development, improvement, or control of lands and waters for the purposes of navigation, flood control, or the production of power. The Federal government continues to maintain authority over lands beneath navigable waters off land owned by the Federal government, lands held by the Federal government for the benefit of any Tribe, band, or group of Indians or for individual Indians, as well as all structures and improvements constructed by the United States in the exercise of its navigational servitude. The actual water of the Great Lakes remains under Federal authority as navigable waters.

Under the Submerged Lands Act, “lands beneath navigable waters” are defined as (1) all lands within the boundaries of each of the respective states which are covered by nontidal waters that were navigable under the laws of the United States at the time such state became a member of the Union up to the ordinary high water mark as heretofore or hereafter modified by accretion, erosion, and reliction;¹¹ (2) all lands permanently or periodically covered by tidal waters up to but not above the line of mean high tide and seaward to a line three geographical miles distant from the coast line of each such state and to the boundary line of each such state where in any case such boundary as it existed at the time such state became a member of the Union;¹² and (3) all filled in, made, or reclaimed lands which formerly were lands beneath navigable waters, as hereinabove defined.

Under E.O. 13158 (U.S. President 2000), each Federal agency whose authorities provide for the establishment or management of Marine Protected Areas (MPAs) must take action to enhance or expand protection of existing MPAs and establish or recommend, as appropriate, new MPAs. The definition of “marine environment” under this E.O. includes the Great Lakes. This E.O. is in furtherance of the purposes of the National Marine Sanctuaries Act (16 USC § 1431 et seq.); National Wildlife Refuge System Administration Act of 1966 (16 USC § 668dd-ee), National Park Service Organic Act (16 USC § 1 et seq.), National Historic Preservation Act (16 USC § 470 et seq.), Wilderness Act (16 USC § 11331 et seq.) Magnuson-Stevens Fishery Conservation and Management Act (16 USC § 1801 et seq.), Coastal Zone Management Act (16 USC § 1451 et seq.), Endangered Species Act of 1973 (16 USC § 1531 et seq.), Marine Mammal Protection Act (16 USC § 1362 et seq.), Clean Water Act of 1977 (33 USC § 1251

¹⁰ 43 USC §§ 1301–1315.

¹¹ Reliction is defined as a slow change of water line on real property that results in the owner obtaining additional dry land.

¹² The seaward boundary of each Great Lakes state is approved and confirmed as a line to the international boundary.

et seq.), National Environmental Policy Act, as amended (42 USC § 4321 et seq.), Outer Continental Shelf Lands Act (42 USC § 1331 et seq.), and other pertinent statutes.

The Department of Commerce and the Department of the Interior, in consultation with the Department of Defense, the Department of State, the United States Agency for International Development, the Department of Transportation, the EPA, the National Science Foundation, and other pertinent Federal agencies is developing a national system of MPAs. The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), in cooperation with the Department of the Interior, is establishing a marine Protected Area Center; creating a Web site (<http://mpa.gov/>); and conducting necessary research, analysis, and exploration. Although the list of MPAs affected by this order has not yet been published, it may include water bodies currently protected under the National Estuaries Program, wildlife refuges, and other significant natural and cultural resources in marine environments. In addition, the EPA must use the CWA authorities to expeditiously propose new science-based regulations, as necessary, to ensure appropriate levels of protection for the marine environment, including identification of areas that warrant additional pollution protections and the enhancement of marine water quality standards. The EPA evaluates new regulations under the CWA to determine the impact on MPAs. No regulations specific to the Great Lakes have been promulgated in response to this E.O.

4.3 STATE LEGISLATION, POLICIES, AND AGREEMENTS

In 1985, the eight governors of the Great Lakes states signed a nonbinding statement of principle entitled "A Statement of Principle Against Oil Drilling in the Great Lakes," agreeing to ban oil drilling in the waters of the Great Lakes.¹³ This statement, however, did not specifically address directional drilling or drilling for natural gas.

At present, Michigan is the only state in the United States that has leased directionally drilled wells under the Great Lakes. The other Great Lakes states either do not permit drilling or do not have the necessary geologic conditions for petroleum generation, expulsion, or entrapment. The states that have since reconsidered the issue of drilling have taken the position that the governor's compact applies only to offshore drilling and not to directional drilling from land.

In 2002, the Michigan Senate approved a permanent ban on Great Lakes drilling and dropped the House provision to reopen development in the event of an energy emergency. The permanent ban automatically took effect after Michigan Governor John Engler refused to sign the legislation. On April 5, 2002, Gov. Engler sent a letter to the legislature indicating he thought the ban was based on flawed policy rather than sound science, would reduce future revenues that would otherwise be available to protect Michigan's environment, and was directly contrary to

¹³ A "Statement of Principle Against Oil Drilling in the Great Lakes" was signed by the governors of Michigan (James J. Blanchard), Wisconsin (Anthony S. Earl), Pennsylvania (Dick Thornburgh), Minnesota (Rudy Perpich), Indiana (Robert D. Orr), Ohio (Richard F. Celeste), Illinois (James R. Thompson), and New York (Mario M. Cuomo) and states, "We collectively state our opposition to oil drilling in the waters of the Great Lakes or their connecting channels."

our nation's goal of achieving energy independence. He also stated that the ban on directional drilling instituted by the Federal government was Congressional interference in state powers. The Michigan state constitution allows a new law to take effect if it has not been signed or vetoed within 14 days of final passage.¹⁴ The permanent ban automatically took effect 14 days after final passage since it was neither signed nor vetoed by the governor.

On July 14, 2003, Ohio Governor Bob Taft signed an E.O. banning all gas and oil drilling in Lake Erie for the remainder of his term (2006). Ohio Representative Chris Redfern has recently (March 8, 2005) introduced a bill to permanently ban drilling for oil and gas beneath Lake Erie (House Bill 119, a bill to amend Section 1505.07 of the Revised Code to ban the taking or removal of oil or natural gas from and under the bed of Lake Erie).

In New York, an act to amend the Environmental Conservation Law, in relation to oil or natural gas drilling operations or pipelines under certain water bodies has been proposed by New York Assemblyman Sam Hoyt.¹⁵ This act would prohibit oil or natural gas drilling operations or pipelines on or beneath the lands under the waters of Lakes Ontario and Erie, the connecting bays and harbors of such lakes, the connecting waterways of such lakes, or along their shorelines. It would apply to all contracts, includes leases entered into or renewed, but would not apply to contracts, including leases, in force at the effective date and those entered into before such date. This act would amend the Environmental Conservation Law to create a statutory ban.

Wisconsin has instituted a statutory ban on drilling operations for the exploration or production of oil or gas if the drilling extends beneath the beds of the Great Lakes or bays or harbors that are adjacent to the Great Lakes.¹⁶

4.4 STATE REGULATION OF OIL AND NATURAL GAS DRILLING

Most states have regulations pertaining to the technical act of drilling of oil and gas wells (e.g., spacing, casings, and depths), environmental protection (e.g., waste management), plugging/abandonment of wells, and emergency response. In addition, as discussed in Section 4.2, the Submerged Lands Act of 1953 gave each of the eight states bordering the Great Lakes title to and ownership of the lands beneath navigable waters within the Great Lakes within their respective boundaries. The state can use, lease, or sell the rights to these Great Lakes

¹⁴ Act 148, Imd. Eff. Apr. 5, 2002, amended Section 324.61505a of the Michigan Natural Resources and Environmental Protection Act 451 of 1994 to read: "Notwithstanding any other provision of this part or the rules promulgated under this part, beginning on the effective date of this section, the supervisor shall not issue a permit for drilling, or authorize the drilling of, a well beneath the lake bottomlands of the Great Lakes, the connected bays or harbors of the Great Lakes, or the connecting waterways as defined in Section 32301, for the exploration or production of oil or gas unless the applicant holds a lease that was in effect prior to the effective date of the amendatory act that added this section that allows the well to be drilled.

¹⁵ Assembly Bill A06907.

¹⁶ Wisconsin Statutes, Chapter 295, Subchapter II, Oil and Gas, Section 295.3(4).

bottomlands within their jurisdiction. However, under the public trust doctrine, the state is expected to protect the public's interest in waters and submerged bottomlands of the Great Lakes that are deemed fundamental to the well-being of everyone.¹⁷ This section provides a high-level summary of the regulation of oil and gas E&P activities and resource ownership within the eight states bordering the Great Lakes.

4.4.1 Illinois

In Illinois, no person may drill, deepen, or convert any well to an oil or gas production well without a permit from the Illinois Department of Natural Resources, Office of Mines and Minerals (DNR OMM).¹⁸ The application must contain the name of the well, the surveyed location of the well, a map showing the boundaries of the leasehold, the exact location of the well, the depth of the well and the name of the lowest geologic formation to be tested, the locations of all producing wells previously drilled on the drilling unit, and the locations of all offset wells on adjacent drilling units. In addition, if the applicant intends to deviate from the vertical, the application must include a map showing the proposed direction of the deviation and proposed horizontal distance between the end of the well bore and the surface location of the well. Within 60 days after the completion of drilling a certified directional survey of the well must be filed with the DNR OMM showing the surface location of the well, the location of the top and bottom of the producing interval, and the location of the end of the well bore. If the applicant intends to drill one or more horizontal drain holes using a short radius from a vertical well bore, the well bore must be spaced according to the regulations concerning well spacing and construction.¹⁹ In addition, the applicant must file a copy of the directional drilling survey for each horizontal drain hole within 60 days after the completion of the drilling. The application for a permit requires a nonrefundable fee and a bond.

Illinois holds certain lands for the benefit of the People, including lands now submerged and lands that were formerly submerged, but that have been illegally filled in, reclaimed, and occupied.²⁰ The Illinois DNR has the authority to grant permits and leases, with the approval of the Governor in writing, for the extraction of oil, gas, and other petroleum deposits, except that no surface extraction activities shall be performed nor production equipment located on lands owned by the DNR if the state owns 100% of the underlying mineral interests of those lands. Extraction activities underlying lands owned by the DNR that utilize directional drilling techniques may be permitted at the discretion of the Department. However, the Department shall not grant permits on leases for the extraction of oil, gas, and other petroleum deposits from the following classifications of lands if the state owns 100% of the underlying mineral interests: (1) lands where threatened or endangered species occur, as determined pursuant to the Federal

¹⁷ *Illinois Central Railroad Company v. Illinois*, 146 U.S. 387 (1892).

¹⁸ Illinois Oil and Gas Act (225 Illinois Consolidated Statutes 725); 62 Illinois Administrative Code (Ill. Adm. Code) 240.200 et seq.

¹⁹ 62 Ill. Admin. Code 240.400 et seq. and 62 Ill. Admin. Code 240.600 et seq.

²⁰ 5 ILCS 605, Submerged Lands Act.

Endangered Species Act or the Illinois Endangered Species Protection Act, (2) Illinois Natural Area Inventory sites, (3) nature preserves dedicated under the Illinois Natural Areas Preservation Act, (4) lands containing a wild and scenic river as designated under the Wild and Scenic River Area Act, (5) lands registered under the Register of Land and Water Reserves under Part 4010 of Title 17 of the Illinois Administrative Code, and (6) lands on which Federal or state laws or regulations prohibit the surface extraction or production facility activity.²¹

4.4.2 Indiana

In Indiana, no person may drill, deepen, operate, or convert a well for oil and gas purposes without a permit issued by the Indiana Natural Resource Commission, Division of Oil and Gas.²² The permit application must include a fee; a survey showing the location of the proposed well; and a schematic diagram showing depths, geological zones, distance from underground drinking water zones, and construction.²³ In addition to an annual well fee, the applicant must file a bond. Indiana has established regulations on well spacing and drilling unit sizes, as well as construction, operations, and abandonment of wells.²⁴ In addition, it has established spill reporting and mitigation/reclamation requirements.²⁵

Indiana requires a permit from the Indiana Natural Resources Commission for the right to prospect and explore on public land for the occurrence of petroleum.²⁶ Then, at any time during the life of the permit or upon expiration of the exploration permit, the permittee can enter into a lease for the extraction of petroleum.

4.4.3 Michigan

In the State of Michigan, no person may drill or begin the drilling of any well for oil or gas until a permit to drill and operate the well is issued by the Supervisor of Wells.²⁷ When an application to drill an oil and gas well is received by the Department of Environmental Quality (DEQ), Offices of Geological Survey, it must include the permit fee, bond, and all relevant forms and notifications identified on the Permit Application Instructions (Form EQP 7200-1, including lease or well name and number; surface location; bottom hole location; location of endpoint, if directionally drilled; if it is an area where sour (containing H₂S) oil and gas are likely to be encountered; any freshwater aquifers; total depth; formation at total depth; and the proposed

²¹ 5 ILCS 615 Oil and Gas Wells on Public Land Act.

²² 312 Indiana Administrative Code (IAC) 16-3-1.

²³ 312 IAC 16-3-2.

²⁴ 312 IAC Rule 5, Performance Standards and Enforcement, 16-5-1 et seq.

²⁵ 312 IAC 16-5-22 through 16-5-29.

²⁶ Indiana Code (IC) 14-38-1, et seq. and IC 17-1-1 et seq.

²⁷ Mich. Comp. Laws, Section 342.61252.

drilling, casing, cementing, and sealing program. It must also have a survey showing the approximate distances and directions from the well to special hazards or conditions, including surface waters and other environmentally sensitive areas; floodplains; wetlands; natural rivers; dune areas; threatened or endangered species; buildings; freshwater wells; all public water supply wells; public roads; pipelines; and power lines. When the proposed well is located in or adjacent to these types of areas, the person must obtain all environmental permits and approvals and, if so instructed by the Supervisor of Wells, file an environmental impact assessment. The applicant must also have the necessary mineral and surface rights at the time of the application to allow a well to be drilled at the proposed location. If the well site is located on state-owned land, near threatened or endangered species, or within a state-managed area, staffs from the Department of Natural Resources (DNR) may also review the application to conduct a resource evaluation and recommend possible mitigation of impacts.

In addition, under Act 9 of Public Acts of 1929,²⁸ the Michigan Public Service Commission has the authority to regulate production rates of natural gas from gas wells through the issuance of Well Connection Permits, Allowable Withdrawal Orders, and Proration Orders.

In Michigan, the authority to lease state-owned minerals vests with the DNR, Real Estate Division. Application to drill an oil or gas well on state-owned land, near threatened or endangered species, or within a state-managed area, may be reviewed by the DNR to conduct a resource evaluation and recommend possible mitigation of impact. Under Michigan's Great Lakes Submerged Lands Act, the state may lease public trust lands to private parties when it is in the "public interest."²⁹ The lands covered and affected by this part are all of the unpatented lake bottomlands and unpatented made lands in the Great Lakes, including the bays and harbors of the Great Lakes, belonging to the state or held in trust by it, including those lands that have been artificially filled in. The waters covered and affected by this part are all of the waters of the Great Lakes within the boundaries of the state. This part shall be construed so as to preserve and protect the interests of the general public in the lands and waters described in this section, to provide for the sale, lease, exchange, or other disposition of unpatented lands and the private or public use of waters over patented and unpatented lands, and to permit the filling in of patented submerged lands whenever it is determined by the Department that the private or public use of those lands and waters will not substantially affect the public use of those lands and waters for hunting, fishing, swimming, pleasure boating, or navigation or that the public trust in the state will not be impaired by those agreements for use, sales, lease, or other disposition.

4.4.4 Minnesota

In Minnesota, a person needs a license from the Commissioner of Natural Resources to conduct exploratory boring.³⁰ Thirty days before making an exploratory boring, a licensee must

²⁸ Michigan Compiled Laws 483.151–483.162.

²⁹ Mich. Comp. Laws, Section 324.32502.

³⁰ Minnesota Statutes, Section 103I.601.

register with the Commissioner of Natural Resources and provide a copy of the registration to the Commissioner of Health. Ten days before beginning exploratory boring, a licensee must submit to the Commissioners of Health and Natural Resources a map showing the location of each proposed exploratory boring to the nearest estimated 40-acre (16-ha) parcel.

In Minnesota, the Commissioner of Natural Resources may issue leases to prospect for, mine, and remove minerals other than iron ore upon any lands owned by the state, including trust fund lands. All leases for nonferrous metallic minerals or petroleum must be approved by the Executive Council.³¹

4.4.5 New York

In New York, the Bureau of Oil and Gas Regulation in the New York Department of Environmental Protection (DEP), Division of Mineral Resources, oversees permitting, compliance, and enforcement of all regulated wells in New York.³²

A permit application must be filed, along with a plat, proposed drilling program, including the proposed casing, cementing, completion testing and stimulation procedures fee, and an environmental assessment form (EAF). The EAF includes information about the physical setting of the proposed project, the general character of the land and land use, the projected size of the area that will be disturbed, and the length of time the drilling rig will be on the site. The applicant must also describe on the EAF the procedures that will be used to construct the access road, supply water for drilling, contain and dispose of wastes, and reclaim the site. Information provided on the EAF allows the Division of Mineral Resources to evaluate the environmental impacts and site-specific concerns associated with the proposed drilling activity and determine whether special permit conditions, a Supplemental Environmental Impact Statement, or any additional Department permits are required.

The New York Department of Environmental Conservation (DEC), Division of Mineral Resources, Bureau of Oil and Gas Regulation, is authorized under the Environmental Conservation Law Article 23, Title 11, to lease state lands for oil and gas exploration and development and for underground gas storage. However, the DEC is not authorized to lease lands under the waters of Lake Ontario or lands under Lake Erie for oil development. Under the New York Public Lands Law,³³ the Commission of General Services may grant leases, easements, and lesser interests, including permits, for the use of state-owned land underwater. Such grants must be consistent with the public interest in the use of state-owned lands underwater, for purposes of navigation, commerce, fishing, bathing, and recreation; environmental protection; access to the navigable waters of the state; and with due regard for the need of affected owners of private property to safeguard their property. The Commissioner of

³¹ Minn. Statutes, Section 93.25.

³² Environmental Conservation Law, §§ 23-0305[8] [9]; 6 New York Code Rules and Regulations (NYCRR) 550-559.

³³ Public Lands, Chapter 46, Article 6, Section 75.

Environmental Conservation and the Secretary of State shall review any proposed lease, easement, permit, or other interest and can recommend conditions to protect the environment and natural resources for incorporation into the lease. The Secretary of State also has input with respect to coastal issues, or shall deny the proposal if the Commissioner of Environmental Conservation, upon administrative findings, determines that the environment or natural resources cannot be adequately protected.

4.4.6 Ohio

Ohio law requires a permit to drill a new well, deepen an existing well, reopen an existing well, convert a well to any use other than its original purpose, or to plug back a well to a different source of supply.³⁴ The Division of Mineral Resources Management in the Ohio DNR has sole authority for permitting and siting oil and gas wells and production facilities. The application must include the designation of the well by name and number; the plan for disposal of water and other waste substances resulting from, obtained, or produced in connection with exploration, drilling, or production of oil or gas; an affidavit that the applicant is the owner; a map showing the subject tract of land or drilling unit upon which the well is to be drilled; the location of the proposed well; and the locations of all buildings, public roads, railroads, and streams within one 150 ft (46 m) of the proposed well site.

In addition, the maximum point at which a well penetrates the producing formation shall not vary unreasonably from the vertical drawn from the center of the hole at the surface, with the exception of approved directional drilling. The Division of Mineral Resources Management will not issue a permit for the drilling of a new well, the reopening of an existing well, or the deepening or plugging back of an existing well to a different pool for the production of oil and gas unless the proposed well location and spacing substantially conform to the requirements of its rules. All persons engaged in any phase of operation of any well or wells must conduct such operation or operations in a manner that will not contaminate or pollute the surface of the land, or water on the surface or in the subsurface.

The Ohio General Assembly designated the DNR as the state agency in all matters pertaining to the care, protection, and enforcement of the state's rights in Lake Erie.³⁵ The DNR is to control, manage, and direct an upland owner's use and occupation of Lake Erie public trust lands through the medium of leasing those lands.³⁶ The DNR recognizes no boundary higher or lower than the ordinary high-water mark of Lake Erie as the landward boundary of the lands held in trust for the people of the state. Upon application of any person who wants to develop or improve part of the territory, and after the director determines that any part of this land can be developed and improved without impairment of the public right of navigation, water commerce, and fishery, a lease of all or any part of the land may be entered into or a permit may be issued.

³⁴ Ohio Revised Code, Chapter 1509, Section 1509.22.1; Ohio Administrative Code 1501:9, et seq.

³⁵ Ohio Revised Code, Section 1506.10.

³⁶ Ohio Revised Code, Section 1506.11.

4.4.7 Pennsylvania

In Pennsylvania, the Bureau of Oil and Gas Management is responsible for the statewide oil and gas conservation and environmental programs to facilitate the safe exploration, development, and recovery of Pennsylvania's oil and gas in a manner that will protect the Commonwealth's natural resources and the environment. The Bureau develops policies and programs for the regulation of oil and gas development and production pursuant to the Oil and Gas Act, the Coal and Gas Resource Coordination Act, and the Oil and Gas Conservation Law;³⁷ oversees the oil and gas permitting and inspection programs; develops statewide regulation and standards; conducts training programs for industry; and works with the Interstate Oil and Gas Compact Commission and the Technical Advisory Board.

The Pennsylvania DEP enforces Pennsylvania's oil and gas laws relating to resource management, well construction activities, and waste management practices. An operator must secure a bond before applying for a well permit. The DEP approves bonds and well permits, inspects wells and environmental controls, and permits and inspects waste disposal facilities and waste management activities. Operators must submit reports on well completion, waste management, annual production, and well plugging. The DEP has the authority to take action to enforce compliance with applicable laws and to seek civil penalties for violations of these laws.

In Pennsylvania, through various state agencies the Commonwealth owns property that is available under lease for oil and gas development — for example, state forests, parks, and state game lands. There are even a few gas wells on the campuses and lands of state universities. The leasing of oil and gas rights on land owned by the Commonwealth is administered by the Department of Conservation and Natural Resources, Bureau of Forestry, Minerals Section.

4.4.8 Wisconsin

In Wisconsin, no person may engage in the exploration for or production of oil or gas without a license from the Wisconsin DNR.³⁸ However, there is a ban on drilling beneath the beds of the Great Lakes or bays or harbors that are adjacent to the Great Lakes.³⁹ The Wisconsin DNR has issued regulations concerning oil and gas exploration.⁴⁰ An application for an exploration license must be filed with the Wisconsin DNR and must include a fee and a bond payable to the Department in the amount of \$50,000 conditioned on the faithful performance of the regulatory requirements. In addition, prior to constructing any drill holes, the licensee must receive written approval from the Wisconsin DNR. An application for drill hole construction approval must contain the location and date of commencement of drilling; proposed method of drilling; proposed drill hole construction, proposed method of containing any oil and gas that

³⁷ 25 Pa. Code § 78.1, et seq. and § 79.1 et seq.

³⁸ Wisconsin Statutes, Chapter 295, Subchapter II, Oil and Gas.

³⁹ Wisconsin Statutes, Section 295.33(4).

⁴⁰ Wisconsin Administrative Code, Chapter on Natural Resources (NR) 134.

might be encountered; proposed method of containment and eventual disposal of any groundwater that may flow to or is otherwise brought to the ground surface; and the proposed method of drill hole abandonment and drilling site reclamation. If the Wisconsin DNR finds that the proposed drill hole location, construction, abandonment, and site reclamation will adequately protect the waters of the state, it will grant the approval. Such approval can be conditioned to provide such protection.

The Wisconsin Board of Commissioners of Public Lands may grant leases of parts or parcels of any public lands except state park lands and state forest lands; grant easements, leases to enter upon the lands to flow the same or to prospect for and to dig and remove ore, minerals and other deposits, and sell such timber as the board shall find necessary to prevent future loss or damage.⁴¹

4.5 ENVIRONMENTAL REGULATIONS APPLICABLE TO OIL AND GAS EXPLORATION AND PRODUCTION

The onshore and offshore segments of the oil and gas extraction industry are subject to different sets of regulations. Onshore, activities primarily are under the authority of the EPA or the authorized state authority. Although certain wastes from oil and gas exploration are partially exempt from Federal regulation under the Resource Conservation and Recovery Act (RCRA), states may impose regulations or requirements over and above the Federal requirements discussed below on oil and gas exploration activities taking place within their borders. The eight states involved have primary authority for the enforcement of Federal environmental laws within their state borders. Each state may have slightly different regulatory requirements governing impacts to the environment from oil and gas E&P.

The following discussion is based on information from the EPA's industry sector notebook entitled *Profile of the Oil and Gas Extraction Industry* (EPA 2000), and it outlines the type of environmental regulations that may apply to emissions, waste management, and discharges from oil and gas E&P activities.

Produced water is the largest volume waste generated in oil and gas extraction operations. The concentration of contaminants in produced water varies from region to region and depends on the geology of the production zone and the age of the well, among other factors. Since most contaminants found in produced water are naturally occurring, they will vary based on what is present in the subsurface at a particular location.

Associated wastes are a relatively small but significant category of waste from the oil and gas extraction industry. The term "associated wastes" encompasses a wide range of small-volume waste streams essential to oil and gas extraction. Because of their nature, these waste streams are the most likely to contain constituents of concern.

⁴¹ Wisconsin Statutes, Section 24.39.

Well maintenance, including work over, treatment, and completion, requires the use of fluids similar to drilling fluid and is the largest miscellaneous source of waste. These fluids may contain a range of chemicals (depending on the maintenance activity undertaken) and naturally occurring materials (i.e., trace metals). Because of the presence of these constituents, the wastes require proper disposal. Onshore, most of these wastes are disposed of through Class II injection wells.

Table 4.1 lists the major Federal laws, E.O.s., and other compliance instruments that establish permits, approvals, or consultations that may be applicable to the extraction of oil and gas from drilling under the Great Lakes. The table is divided into general environmental resource categories. The citations in the table are those of the general statutory authority that governs the indicated category of activities to be undertaken under the proposed action and alternatives. Under such Federal statutory authority, the lead Federal or state agency may have promulgated implementing regulations that set forth the detailed procedures for permitting and compliance. The sections following the table provide more detail on the application of some of these laws or regulations.

TABLE 4.1 Major Federal Laws, Executive Orders, and Other Compliance Instruments That Establish Permits, Approvals, or Consultations That May Be Applicable to the Extraction of Oil and Gas from under the Great Lakes.

Air Quality and Noise

Clean Air Act (CAA) (42 USC § 7401 et seq.)

Noise Control Act as Amended by the Quiet Communities Act (42 USC § 4901 et seq.)

Water Bodies, Floodplains, and Wetlands

Clean Water Act (33 USC § 1344)

Rivers and Harbors Act of 1899 (33 USC § 401 et seq.)

Water Bodies, Floodplains and Wetlands

E.O. 11988, "Floodplain Management" (May 21, 1977)

E.O. 11990, "Protection of Wetlands" (May 24, 1977)

E.O. 13158, "Marine Protected Area" (May 26, 2000)

Wastewater and Storm Water

Clean Water Act (CWA) (33 USC § 1251 et seq.)

Oil Pollution Control Act (33 USC § 2701 et seq.)

Pollution Prevention Act (PPA) of 1990 (42 USC § 13101 et seq.)

Hazardous Materials and Waste

Solid Waste Disposal Act (SWDA) (42 USC § 6901 et seq.)

Hazardous Waste and Polychlorinated Biphenyls (PCBs)

Toxic Substances Control Act (TSCA) [15 USC § 2605(e)]

Solid Waste Disposal Act (SWDA), as amended by the Resource Conservation and Recovery Act (RCRA) (42 USC § 6901 et seq.) and the Hazardous Solid Waste Amendments of 1984 (HSWA)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC § 9601 et seq.)

Emergency Planning and Community Right-to-Know Act (EPCRA) (42 USC § 11001 et seq.)

TABLE 4.1 (Cont.)***Source Water Protection, Groundwater, and Drinking Water***

Safe Drinking Water Act (SDWA) [42 USC § 300(f) et seq.]

Wildlife

Bald and Golden Eagle Protection Act (16 USC 668)

Migratory Bird Treaty Act (16 USC § 703)

Endangered Species Act (16 USC § 1531 et seq.)

Wild Free-Roaming Horse and Burro Act of 1971 (P.L. 92-195)

E.O. 13112, “Invasive Species” (February 3, 1999)

Land Use

Coastal Zone Management Act (16 USC § 1451 et seq.); Coastal Zone Act Reauthorization Amendments of 1990 [16 USC § 1456 (c)(3)(A)]

Wild and Scenic Rivers Act (16 USC §1271 et seq.)

Submerged Lands Act of 1953 (43 USC § 1301–1315)

Farmland Protection and Policy Act (7 USC § 4201 et seq.)

Soil and Water Conservation Act of 1977 (16 USC § 2001 et seq.)

E.O. 12898, “Environmental Justice” (February 11, 1994)

E.O. 13045, “Protection of Children from Environmental Health Risks and Safety Risks” (April 21, 1997)

Archaeology, Paleontology, and Historic Preservation

E.O. 13007, “Indian Sacred Sites” (May 24, 1996)

E.O. 13084, “Consultation and Coordination with Indian Tribal Governments” (May 14, 1998)

Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC § 3001)

American Indian Religious Freedom Act (AIRFA) (42 USC § 1996)

Archeological Resources Protection Act [16 USC § 470(aa) et seq.]

Archaeological and Historic Preservation Act (AHPA) (16 USC § 469a et seq.)

Antiquities Act (16 USC § 431 et seq.)

National Historic Preservation Act (NHPA) (16 USC § 470 et seq.)

E.O. 11593, “Protection and Enhancement of the Cultural Environment” (May 15, 1971)

4.5.1 Clean Air Act (CAA)

The oil and gas production industry is subject to National Emission Standards for Hazardous Air Pollutants (NESHAPs). The regulation calls for the application of maximum achievable control technology in order to reduce the emissions of hazardous air pollutants (HAPs) at facilities classified as major sources. The primary HAPs released by the industry are benzene, toluene, ethyl benzene, and mixed xylenes (BTEX), and *n*-heptane. The technology requirements involve the following emission points: process vents on glycol dehydration units, storage vessels with flash emissions, and equipment leaks at natural gas processing plants. Additional requirements include the installation of air emission control devices, and adherence to test methods and procedures, monitoring and inspection requirements, and record keeping and reporting requirements. Another air pollutant of concern at oil and gas production sites is H₂S. Although this pollutant was originally listed as a potential HAP and studies were conducted by

the EPA in accordance with the direction in the Clean Air Act Amendment of 1990, it was removed from the list [Section 112(b)] by Congressional action in 1991. However, H₂S is included in Section 112(r) and is subject to the accidental release provisions. A study was required under Section 112(n)(5) (EPA 2005d). This pollutant may be regulated at the state or local level.⁴²

In addition, New Source Performance Standards may affect E&P facilities. The standards apply to devices used at these facilities, including gas turbines, steam generators, storage vessels for petroleum liquids, volatile organic liquid storage vessels, and gas processing plants. Requirements will depend on whether the region in which the particular facility is located is in compliance with National Ambient Air Quality Standards and whether Prevention of Significant Deterioration requirements apply.

4.5.2 Clean Water Act (CWA)

Onshore E&P facilities may be subject to four aspects of the CWA: (1) national effluent limitation guidelines, (2) storm water regulations, (3) wetlands regulations, and (4) Spill Prevention Control and Countermeasure (SPCC) requirements.

National effluent limitation guidelines have been issued for two subcategories of onshore nonstripper wells.⁴³ The Onshore Subcategory guidelines prohibit the discharge of water pollutants from any source associated with production, field exploration, drilling, well completion, or well treatment (40 CFR 435.30).

Oil and gas E&P facilities are exempt from CWA storm water Phase I regulations for industrial activities under most conditions, with two exceptions: (1) if the facility has a reportable quantity spill that could be carried to waters of the United States via a storm event, or (2) if the storm water runoff contributes to a violation of a water quality standard. (See 40 CFR Parts 117 and/or 302 for reportable quantities of hazardous substances or Part 110 for the reportable quantity of spilled oil.) If either of these two scenarios should happen, the facility would be required to apply for a Multisector General Permit and develop a pollution prevention plan. However, if a reportable quantity spill was to be cleaned up quickly or containment was so total that there would be no threat of a product release as a result of a storm water event, no permit would be required. Coverage under the Phase I regulations and the Construction General Permit for earth-disturbing activities of 5 acres (2 ha) or more was always applicable to oil and gas E&P facility construction activities. However, the Phase II regulations would have extended coverage for earth-disturbing activities of between 1 and 5 acres (0.4 to 2 ha), to oil and gas E&P facilities. In March 2003, the EPA issued a ruling that delayed the start date of the Phase II rule

⁴² In Michigan, permits are reviewed for the probability of encountering H₂S gas based on knowledge of the rock formations from other wells. Activities that do or could produce H₂S as a result of oil and gas production or exploration are regulated by the Michigan DEQ, Air Quality Division, which issues permits on some of the equipment associated with wells and processing facilities such as storage tanks, flares, and other fuel-burning equipment, depending on the amount of emissions expected to be discharged.

⁴³ A nonstripper well is one that produces more than 20 bbl/day of crude oil.

for permitting discharges associated with small construction activities at oil and gas E&P sites to March 10, 2005. Oil and gas industry groups have asked the 5th Circuit U.S. Court of Appeals to vacate the March 2003 rule to the extent that it requires small oil and gas construction activities to obtain any permit coverage under the Phase II rule. On March 7, 2005, the EPA postponed the requirement for permitting discharges from small construction activities at oil and gas E&P sites until June 12, 2006.⁴⁴

During the course of petroleum exploration and development, wetlands may be encountered. Under the CWA, wetlands are defined by the frequency and length of time they are saturated with water, by the type of vegetation they support, and by soil characteristics. Also, by definition, most wetlands are part of the “waters of the United States” and, as such, all discharges of pollutants to wetlands require a CWA permit. However, the CWA regulates not only the discharges of dissolved/suspended pollutants but also the discharge of solids, dredge and fill materials, or dirt to waters of the United States. Permits issued by the Corps are required for discharges of fill and/or dredge into waters of the United States, including wetlands. All work, including dredging, excavation, and construction activities in navigable waters of the United States requires Corps authorization under Section 10 of the Rivers and Harbor Act of 1899. Permits fall under either of two categories (1) general, previously issued permit for certain classes of activities that have been determined to have minimal adverse environmental impacts, individually or cumulatively, and (2) individual, a project-specific permit undergoing individual public interest review prior to issuance. Broadly speaking, individual permits are for projects presumed to have more than minimal adverse environmental impacts. Individual permits involve more intensive regulatory review (33 CFR Parts 320–330), including project-specific public notices and environmental assessments.

The Corps, the EPA, and in some cases, the states oversee enforcement of the CWA provisions for wetlands. Most of the day-to-day administration of the program is implemented by the Corps. The Corps issues and enforces permits and is also responsible for delineating wetlands. States are provided the opportunity to comment on wetland permit applications prior to permit issuance. The EPA regions comment on permit applications and can also enforce these provisions of the CWA. The EPA also helps to develop environmental criteria for wetlands (EPA 1990, 2002b). The Corps can approve a state to administer the CWA Section 404 Wetlands Program; only Michigan and New Jersey are currently approved. If a state is authorized to administer the CWA Wetlands Program, it has sole authority to issue a permit in lieu of a Corps-issued Section 404 Permit on inland waters and joint permit authority with the Corps on traditionally navigable waters and adjacent wetlands. However, the Corps retains administrative authority for Section 10 permitting.

An oil and gas production, drilling, or work-over facility is subject to the EPA’s SPCC requirements if it meets the following specifications: the facility could reasonably be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines and has (1) a total underground buried storage capacity of more than 42,000 gal (158,987 L), and/or (2) a total aboveground oil storage capacity of more than 1,320 gal (4,997 L). SPCC applicability

⁴⁴ *Federal Register*, Volume 70, page 11560 (70 FR 11560) (March 9, 2005).

is dependent on the tank's maximum design storage volume and not "safe" operating or other lesser operational volumes. For purposes of the regulation, an onshore production facility may include all wells, flowlines, separation equipment, storage facilities, gathering lines, and auxiliary non-transportation-related equipment and facilities in a single geographical oil or gas field operated by a single operator.

All facilities subject to SPCC requirements must prepare a site-specific spill prevention plan that incorporates requirements specified in 40 CFR 112.7. In addition, the plan must discuss spill history and spill prediction (i.e., the anticipated direction of flow). The SPCC plan must be approved by a Registered Professional Engineer who is familiar with SPCC requirements, be fully implemented, and be modified when changes are made to the facility (e.g., installation of a new tank). Regardless of whether changes have been made to the facility, the plan must be reviewed at least once every 3 years and amended if new, field-proven technology may reduce the likelihood of a spill.

A portion of SPCC-regulated facilities may also be subject to Facility Response Planning (FRP) requirements if they pose a threat of "substantial harm" to navigable waters. The determination of a "substantial harm" facility is made on the basis of meeting either of two sets of criteria — one involving transfer over water, and the other involving oil storage capacity or other factors. If the facility was subject to FRP requirements, it would be required to develop a facility response plan that would involve, among other requirements, identification of small, medium, and worst-case discharge scenarios and response actions; a description of discharge detection procedures and equipment; detailed implementation plans for containment and disposal; diagrams of the facility and the surrounding layout, topography, and evacuation paths; and employee training, exercises, and drills.

4.5.3 Safe Drinking Water Act (SDWA)

The Underground Injection Control (UIC) program of the SDWA regulates injection wells used in the oil and gas production process for produced water disposal or for enhanced recovery. Wells used in this industry for produced water are classified as Class II. Minimum UIC Class II well requirements, as outlined in 40 CFR Part 144, involve specific construction, operation, and closure standards, as well as provisions for ensuring that the owner, operator, and/or transferor of the well maintains the financial responsibility and resources to plug and abandon the well. Operational standards involve regular (at least once every 5 years) mechanical integrity tests; monitoring of injection pressure, flow rate, and volume; monitoring of the nature of injected fluid as needed; and annual reporting of monitoring results. Finally, closure procedures must be performed in accordance with an approved plugging and abandonment plan, which includes the placement and composition of cement plugs, the amount of casing to be left in the hole, the estimated cost of plugging, and any proposed tests or measurements. Additional requirements may be imposed in states that have been delegated to implement the UIC program.

The EPA has authorized delegation of the UIC for all wells in 35 states, implements the program in 10 states and on all Indian lands, and shares responsibility with 5 states.⁴⁵

4.5.4 Resource Conservation and Recovery Act (RCRA)

Under the 1980 Amendments to RCRA, Congress conditionally exempted certain categories of solid waste from regulation as hazardous wastes under RCRA Subtitle C, including drilling fluids, drill cuttings, produced waters, and other low-volume wastes associated with the exploration, development, or production of crude oil or natural gas. The Amendments required the EPA to study these wastes to determine whether their regulation as hazardous wastes was warranted and to submit a report to Congress. In its report to Congress (EPA 1987) and in a July 1988 regulatory determination (53 FR 25446, July 6, 1988), the Agency stated that regulation as hazardous wastes under Subtitle C was not warranted and that these wastes could be controlled under other Federal and state regulatory programs, including a tailored RCRA Subtitle D (solid waste) program.

Specifically, the EPA's regulatory determination for E&P wastes exempted a variety of wastes from RCRA hazardous waste management requirements, regardless of their potential to contain constituents that are listed as hazardous or may exhibit hazardous characteristics. Table 4.2 identifies many, but not all, exempt wastes. In general, E&P exempt wastes are generated in "primary field operations" and not as a result of maintenance or transportation activities. Exempt wastes are typically limited to those that are intrinsically related to the exploration, development, and production of oil or natural gas.

On March 22, 1993, the EPA provided "clarification" regarding the scope of the E&P waste exemption for waste streams generated by crude oil and tank bottom reclaimers, oil and gas service companies, crude oil pipelines, and gas-processing plants and their associated field gathering lines (see 58 FR 15284–15287). The EPA stated that certain waste streams from these operations are "uniquely associated" with primary field operations and as such are within the scope of the RCRA Subtitle C exemption. The EPA's clarification cautioned, however, that these wastes may not be exempt if they are mixed with nonexempt materials or wastes.

The EPA's 1988 regulatory determination also lists the wastes that are nonexempt. Table 4.3 identifies many, but not all nonexempt wastes, as well as transportation (pipeline and trucking) activities. While these wastes are nonexempt, their regulatory status as "hazardous wastes" is dependent upon a determination of their characteristics or whether they are specifically listed as RCRA hazardous waste.

⁴⁵ States have the option of applying for primary responsibility, or primacy, for the UIC program for all classes of wells, only oil- and gas-related wells (Class II wells), or all wells except oil- and gas-related wells (Classes I, III, IV, and V). If a state does not obtain primacy for all or some of the well classes, then the EPA implements the program directly through one of its regional offices. The EPA administers the UIC programs in Michigan, Minnesota, New York, and Pennsylvania. Illinois, Ohio, and Wisconsin have full primacy for administering their UIC programs. Indiana has authorization to administer the UIC program for Class II wells.

TABLE 4.2 RCRA Exempt Waste Types

-
- Produced water
 - Drilling fluids
 - Drill cuttings
 - Rig wash
 - Drilling fluids and cuttings from offshore operations disposed of onshore
 - Well completion, treatment, and stimulation fluids
 - Basic sediment and water, and other tank bottoms from storage facilities that hold product and exempt waste
 - Accumulated materials such as hydrocarbons, solids, sand, and emulsion from production separators, fluid treating vessels, and production impoundments
 - Pit sludges and contaminated bottoms from storage or disposal of exempt wastes
 - Work-over wastes
 - Gas plant sweetening wastes for sulfur removal, including amine, amine filters, amine filter media, backwash, precipitated amine sludge, iron sponge, and H₂S scrubber liquid and sludge
 - Cooling tower blowdown
 - Spent filters, filter media, and backwash (assuming the filter itself is not hazardous and the residue in it is from an exempt waste stream)
 - Packing fluids
 - Produced sand
 - Pipe scale, hydrocarbon solids, hydrates, and other deposits removed from piping and equipment prior to transportation
 - Hydrocarbon-bearing soil
 - Pigging wastes from gathering lines (liquids or solids generated from cleaning oil pipelines)
 - Wastes from subsurface gas storage and retrieval, except for the listed nonexempt wastes
 - Constituents removed from produced water before it is injected or otherwise disposed of
 - Liquid hydrocarbons removed from the production stream but not from oil refining
 - Gases removed from the production stream, such as H₂S and CO₂, and volatilized hydrocarbons
 - Materials ejected from a producing well during the process known as blowdown
 - Waste crude oil from primary field operations and production
 - Light organics volatilized from exempt wastes in reserve pits or impoundments or production equipment
-

Source: EPA (2000).

The EPA also determined that produced water injected for enhanced recovery is not a waste for purposes of RCRA regulation, and therefore, is not subject to control under RCRA Subtitle C or Subtitle D. Produced water used in this manner is considered beneficially recycled and is an integral part of some crude oil and natural gas production processes. Produced water injected in this manner is already regulated by the UIC Program under the SDWA. However, if produced water is stored in surface impoundments prior to injection, it may be subject to RCRA Subtitle D regulations.

It is important to note that some states have adopted hazardous waste regulations that differ from those promulgated by the EPA. While different in many specific areas, those state programs, by law, still must be at least as stringent as the Federal programs.

TABLE 4.3 RCRA Nonexempt Waste Types

-
- Unused fracturing fluids or acids
 - Gas plant cooling tower cleaning wastes
 - Painting wastes
 - Oil and gas service company wastes, such as empty drums, drum rinsate,^a vacuum truck rinsate, sandblast media, painting wastes, spent solvents, spilled chemicals, and waste acids
 - Vacuum truck and drum rinsate from trucks and drums transporting or containing nonexempt waste
 - Refinery wastes
 - Liquid and solid wastes generated by crude oil and tank bottom reclaimers
 - Used equipment lubrication oils
 - Waste compressor oil, filters, and blowdown
 - Used hydraulic fluids
 - Waste solvents
 - Waste in transportation pipeline-related pits
 - Caustic or acid cleaners
 - Boiler cleaning wastes
 - Boiler refractory bricks
 - Incinerator ash
 - Laboratory wastes
 - Sanitary wastes
 - Pesticide wastes
 - Radioactive tracer wastes
 - Drums, insulation, and miscellaneous solids
-

^a Rinsate is the contaminated solution resulting from rinsing activities.

Source: EPA (2000).

4.5.5 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Under CERCLA, “petroleum, including crude oil or any fraction thereof,” “natural gas,” and “natural gas liquids” are exempted from the definition of “hazardous substance,” unless specifically listed or designated under CERCLA.⁴⁶ Subsequent interpretation has concluded that listed hazardous substances normally found in crude oil, such as benzene, do not invalidate the exemption unless the concentration of these substances is increased by contamination or by addition after refining. Therefore, the notification, response, abatement, remediation, and financial responsibilities established under CERCLA⁴⁷ do not apply to releases of petroleum or natural gas. However, the National Contingency Plan, Subpart D, establishes the requirements for notification, response, and remediation of discharges of oil. Upon the discovery of a release over the reportable quantity, the person making the discovery must notify the National Response Center. The National Response Center maintains predesignated On-Scene Coordinators (OSCs). For oil releases to the Great Lakes, the predesignated OSC would be the U.S. Coast Guard.

⁴⁶ 42 USC § 9601 (14).

⁴⁷ See 40 CFR 300, Subpart E.

4.5.6 Endangered Species Act (ESA)

The ESA provides a means of protecting threatened or endangered species and the ecosystems (critical habitats) that support them. It requires Federal agencies to ensure through consultation that activities undertaken on either Federal or non-Federal property do not adversely impact threatened or endangered species or their habitat. In a 1995 ruling, the U.S. Supreme Court upheld interpretations of the Act that allow agencies to consider impacts on habitat as a potential form of prohibited “harm” to endangered species.⁴⁸ Agencies undertaking a Federal action (such as the Bureau of Land Management or Minerals Management Service review of proposed oil and gas extraction and production operations) must consult with the USFWS, and biological assessment must be prepared by the agency undertaking the action if “any major part of a new source will have significant adverse effect on the habitat” of a federally listed threatened or endangered species. On the basis of the biological assessment, the USFWS will render a biological opinion regarding the proposed action and necessary mitigation measures.

4.5.7 Coastal Zone Management Act (CZMA)

The CZMA encourages states and Tribes to preserve, protect, develop, and where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife using those habitats. It includes areas bordering the Atlantic, Pacific, and Arctic Oceans, Gulf of Mexico, Long Island Sound, and Great Lakes. A unique feature of this law is that participation by states and Tribes is voluntary.

In the Coastal Zone Management Act Reauthorization Amendments (CZARA) of 1990, Congress identified non-point-source pollution as a major factor in the continuing degradation of coastal waters. Congress also recognized that effective solutions to non-point-source pollution could be implemented at the state, Tribal, and local levels. In CZARA, Congress added Section 6217,⁴⁹ which calls upon states and Tribes with federally approved coastal zone management programs to develop and implement coastal non-point-source pollution control programs. The Section 6217 Program is administered at the Federal level jointly by the EPA and the NOAA. Section 6217(g) called for the EPA, in consultation with other agencies, to develop guidance on “management measures” for sources of non-point-source pollution in coastal waters. Under Section 6217, the EPA is responsible for developing technical guidance to assist states and Tribes in designing coastal non-point-source pollution control programs. On January 19, 1993, the EPA issued its *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, which addresses five major source categories of non-point-source pollution: (1) urban runoff, (2) agriculture runoff, (3) forestry runoff, (4) marinas and recreational boating, and (5) hydromodification (EPA 1993).

⁴⁸ *Babbitt vs. Sweet Home Chapter of Communities for a Greater Oregon*, 515 U.S. 687 (1995).

⁴⁹ 16 USC § 1455b.

Section 307 of the CZMA (16 USC § 1456), called the Federal Consistency provision, requires that Federal agency activities that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone (also referred to as coastal uses or resources and coastal effects) must be consistent to the maximum extent practicable with the enforceable policies of a coastal state's federally approved Coastal Management Program (CMP). (Federal agency activities are activities and development projects performed by a Federal agency, or a contractor for the benefit of a Federal agency.)

Federal license or permit activities and Federal financial assistance activities that have reasonably foreseeable coastal effects must be fully consistent with the enforceable policies of State CMPs. (Federal license or permit activities are activities proposed by a non-Federal applicant requiring Federal authorization, and Federal financial assistance activities are proposed by state agencies or local governments applying for Federal funds for activities with coastal effects.)

Federal Consistency reviews are the responsibility of the lead state agency that implements or coordinates the state's federally approved CMP. At the Federal level, the Office of Ocean and Coastal Resource Management, within the NOAA's National Ocean Service, among other duties and services, interprets the CZMA and oversees the application of Federal Consistency; provides management and legal assistance to coastal states, Federal agencies, Tribes, and others; and mediates CZMA-related disputes.

4.5.8 Emergency Planning and Community Right-to-Know Act (EPCRA)

The EPA's Toxics Release Inventory (TRI) Program was established by Congress under Section 313 of EPCRA and was expanded by the Pollution Prevention Act of 1990. It requires certain facilities in covered industry sectors to file reports of their environmental releases and other waste management quantities of chemicals listed on the EPCRA Section 313 list of toxic chemicals if they manufacture, process, or otherwise use more than established threshold quantities of these chemicals. However, only facilities that are included in specified Standard Industrial Classification Codes are required to comply with the TRI program. Although petroleum bulk terminals and plants are so listed, oil and gas E&P facilities are not. Therefore, the oil and gas E&P facilities are currently not required to report or file a TRI or an annual report of toxic chemical releases under EPCRA Sections 312 and 313.⁵⁰

4.5.9 Naturally Occurring Radioactive Materials

Material containing radionuclides that are present naturally in soil, rocks, water, and minerals and whose radioactivity has been concentrated and/or exposed to the accessible environment as a result of human activities is referred to as technologically enhanced naturally occurring radioactive material or TENORM. In the U.S, by definition, TENORM that does not

⁵⁰ 42 USC §§ 1102–11023.

contain more than 0.05% uranium or thorium by weight, or any combination thereof, is not subject to regulatory control under the Atomic Energy Act of 1954 because it does not meet the definitions for a source material, special nuclear material, or byproduct material (42 U.S.C. Section 2011-2259). TENORM, also by definition, is not subject to regulatory control under the Low Level Radioactive Waste Policy Act. Under that Act, low level radioactive waste (LLW) is defined as material that (i) is not a high-level radioactive waste, spent nuclear fuel, or byproduct material and (ii) has been classified by the Nuclear Regulatory Commission (NRC) as a LLW (42 U.S.C. Section 2021b-2021j). At this time, the NRC has not classified NORM as a LLW.

The primary radionuclides of concern in petroleum industry TENORM are radium-226 and radium-228 and their decay progeny, including radon. Oil and gas E&P results in the extraction of underground water that may naturally contain radium. The radium (if present in the produced water) as a result of changes in pressure, temperature, and chemistry at surface conditions may form a mineral scale on production piping, tanks, and separators at the field site. It may also be found in sludges and evaporite deposits in tanks, wastewater, and mud pits on the site. Typically, radium is not found in the produced oil; however small amounts of radon may be present in produced gas. Pipe yards where mineral scale has been removed during maintenance activities may have radium contamination of soils. TENORM generated by the petroleum industry may be divided into two general categories: (1) wastes containing radium isotopes and their progeny, and (2) wastes containing only lead-210 (Pb-210) and its progeny. Not all oil and gas fields have TENORM accumulations, however.

Currently no EPA regulations exist that specifically control the management and disposal of elevated levels of TENORM wastes associated with the production of oil and natural gas. Because TENORM waste is generated in primary oil field operations intrinsic to exploration, development, or production activities, it is an exempt waste under RCRA Subtitle C. There are EPA regulations related to some TENORM, including control of radionuclides in water, guidance for radon control in buildings, and cleanup of radioactively contaminated soils, but they are not specific to petroleum industry TENORM.

The U.S. Department of Labor's OSHA has set occupational dose limits (29 CFR 1910.1096) of 500 mrem/yr for a workers classified as radiation workers. In most states, however, oilfield personnel have not been classified as radiation workers. Instead, workers are subject to dose limits established for the general public (i.e., 100 mrem/yr from all sources combined). OSHA standards contained in 29 CFR Part 1910.1096, "Ionizing Radiation," may be applicable to petroleum industry workers who handle TENORM.

In the absence of specific Federal regulations, some states have issued general regulations for TENORM or for specific TENORM materials, while other states include TENORM in their controls for all radioactive substances. A few states have developed regulations specific to oil and gas industry TENORM; however, the remaining states address TENORM in more general terms, including establishing minimum radiation limits for any wastes to be disposed of to hazardous waste or solid waste landfills, injected into wells, or disposed of to the soil. The existing state regulatory programs establish standards for (1) TENORM exemption or action levels; (2) the licensure of parties possessing, handling, or disposing of TENORM; (3) the release of (NORM)-contaminated equipment and land; (4) worker protection; and (5) TENORM

disposal. Most state NORM programs address the disposal of TENORM wastes associated with oil and gas E&P, including (1) burial at a licensed NORM or low-level radioactive waste disposal facility, (2) encapsulation down hole inside the casing of a well about to be plugged and abandoned, and (3) underground injection into a subsurface formation. The action levels defining when wastes must be managed as TENORM wastes vary from state to state. These levels typically are expressed in terms of radionuclide activity concentrations (i.e., pCi/g), exposure levels (i.e., $\mu\text{R/h}$), surface contamination levels (in disintegrations per minute per 100 cm^2), and radon flux (i.e., $\text{pCi/m}^2/\text{s}$). Materials exceeding any one of these state-prescribed levels become regulated TENORM materials within that state. The Conference of Radiation Control Program Directors (CRCPD) is the organization through which state radiation protection programs coordinate their efforts. CRCPD's Commission on TENORM, has developed a model regulation for TENORM (CRCPD 2004). Some of the current state regulations follow this model.

The Illinois regulations for control of radiation apply to all ionizing radiation, whether emitted from radionuclides or devices.⁵¹ The Illinois Emergency Management Agency issues licenses for possession and use of radioactive materials, including naturally occurring and accelerator-produced radionuclides. In addition, sections of the oil and gas regulations issued by the Illinois Department of Natural Resources, Division of Oil and Gas, address TENORM with respect to storage structure and pit closures.⁵²

In Indiana, users of radioactive materials are required by statute⁵³ to register the materials with the Indiana State Department of Health (ISDH). Radioactive materials include by-product, source, and special nuclear materials, all licensed by the NRC; and naturally occurring/accelerator-produced radioactive material (NARM), which is regulated by the ISDH. In accordance with the Indiana Rule for Radiation Control,⁵⁴ each person who receives, possesses, uses, transfers, owns, or acquires radioactive material shall register such materials with the ISDH. However, only registrants utilizing NORM over the regulatory quantity are subject to inspection and enforcement by the ISDH. Indiana is a non-Agreement State (i.e., has not received NRC approval to license and regulate NRC-regulated radioactive materials).

The Michigan Department of Environmental Quality (MDEQ) has similar regulation of all radionuclides and has issued guidelines allowing the disposal of materials contaminated with average concentrations of up to 50 picoCuries per gram of radium-226 in landfills that are designed and permitted to receive nonhazardous municipal wastes (MDEQ 2005). These guidelines are applicable to radium-bearing NORM wastes generated by the petroleum industry. In addition, the MDEQ, Oil and Gas Division, has issued a special order regarding the plugging of wells where NORM may be present (MDEQ 1992).

⁵¹ 32 Illinois Administrative Code.

⁵² 62 Illinois Administrative Code, Chapter I, Section 240, Subpart H.

⁵³ Radiation Control Act of Indiana (IC 16-41-35), specifically, IC 16-41-35-26(d).

⁵⁴ 410 IAC Chapter 5, specifically, 410 IAC 5-2-1.

Radioactive materials in Minnesota are currently regulated by both the NRC and the Minnesota Department of Health (MDH). The NRC regulates nuclear by-product material, which in simple terms is any radioactive material yielded in, or made radioactive by, a nuclear reactor. The MDH currently regulates NARM.⁵⁵ The MDH has developed a regular and an abbreviated license application for NARM.

The NY DEC regulates environmental releases and the disposal of radioactive material. DEC requires a permit for release of radioactive material to the environment, including the disposal of radioactive material (NORM, such as radium) and accelerator-produced radionuclides.⁵⁶ However, the NY DEC has concluded that New York State oil and gas production equipment and wastes are not significantly contaminated by NORM. The concentrations of NORM found on oil and gas production equipment and wastes pose no threat to the public health and the environment. The research and analysis supporting this conclusion were performed in 1996. Direct measurements of the radioactivity at well sites were performed. Samples of scales, sludges, sediments, soils, water, rock, brines, waxes, and oils were taken and analyzed by gamma spectrometry (NYSDEC 1999).

The Ohio Regulations for Control of Radiation⁵⁷ apply to all ionizing radiation, whether emitted from radionuclides or produced by machines. The Ohio Department of Health issues licenses for the possession and use of all radioactive material, including naturally occurring materials, such as certain isotopes of radium, and accelerator-produced radionuclides. Specific requirements regarding TENORM-bearing materials are found in Section 3701-39, §021 of the Ohio Administrative Code.

The State of Pennsylvania regulates all ionizing radiation, specifically including naturally occurring or accelerator produced materials. The Bureau of Radiation Protection, Department of Environmental Protection, requires a license for the possession and use of such sources over certain limits and waste disposal requirements.⁵⁸

Wisconsin requires that any person who possesses, uses, manufactures, transports, stores or transfers radioactive materials in Wisconsin must have a radioactive materials license.⁵⁹ Effective August 11, 2003, the Department of Health and Family Services licenses and inspects by-product, source, special nuclear, and NARM in Wisconsin (unless it is below the regulatory quantity).

⁵⁵ Minnesota Rules, Chapter 4731.

⁵⁶ Title 6, Parts 380, 381, 382, and 383 of the New York Codes, Rules, and Regulations.

⁵⁷ Section 3701 Ohio Administrative Code.

⁵⁸ Pennsylvania Code, Title 25, Subpart D, Article V, Radiological Health.

⁵⁹ Section 254.365 of the Wisconsin Statutes.

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